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Digital Transformation, Financial Efficiency, Financial Effectiveness and Firm Values

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Abstract

This study investigates the impact of digital transformation on firm values-mediated by financial efficiency and financial effectiveness-among companies listed in the SET100 index from 2019 to 2023. Structural equation modeling (SEM) assesses model fit and tests the hypotheses. The analysis reveals that all goodness-of-fit indices fall within recommended cut-offs, indicating that the hypothesized model adequately reproduces the observed covariance matrix and is suitable for the proposed theoretical framework. Hypothesis tests show that digital transformation significantly enhances financial efficiency, measured by return on assets and return on equity ($p < 0.001$), and financial effectiveness, reflected in revenue growth and net profit margin ($p < 0.001$), while also exerting a direct positive effect on firm values ($p < 0.001$). Both financial efficiency indicators improve firm values ($p < 0.01$ and $p < 0.001$, respectively), and revenue growth contributes positively ($p < 0.01$); however, the effect of net profit margin, though positive, is not statistically significant ($p > 0.05$). Mediation analysis confirms that financial efficiency and revenue growth significantly mediate the influence of digital transformation on firm values, whereas net profit margin does not-implying that efficient asset utilization, high equity returns, and revenue expansion are the primary drivers of value creation from digital transformation rather than cost control efficiency.

Keywords: Digital transformation, Financial efficiency, Financial effectiveness, Firm values

Introduction

Digital transformation has emerged as a critical strategy for enhancing the competitive capabilities of modern companies. The adoption of digital technologies profoundly influences how firms collect, store, analyze, and disseminate information, as well as how individuals and departments communicate and collaborate both within and beyond the organization (Yang et al., 2024). The integration of advanced technologies, such as the Internet of Things (IoT), Artificial Intelligence (AI), and Blockchain, enhances agility, adaptability, and operational efficiency, ultimately improving corporate performance (Basile et al., 2024). Moreover, digital transformation

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reshapes business operations and interactions with consumers, suppliers, and stakeholders, fostering innovation and delivering greater value to customers (Liu et al., 2024). The growing focus on the impact of digital transformation on business performance has stimulated extensive research into its multifaceted effects.

When firms adopt digital technologies, they fundamentally reshape resource utilization and revenue-generation models. For instance, in terms of financial efficiency, digital initiatives can reduce capital lock-up and scale operations more effectively, directly increasing return on assets (Chao et al., 2024). Similarly, the deployment of artificial intelligence, blockchain, and big data enhances efficiency on the equity side, lifting return on equity (Sun & Jiao, 2024). Regarding financial effectiveness, e-commerce adoption drives stronger revenue growth relative to competitors or firms without such capabilities (Saridakis et al., 2018), while digital technologies also trim financial, selling, and administrative expenses, thereby boosting net profit margin (Liu et al., 2023). Together, these four metrics-return on assets, return on equity, revenue growth, and net profit margin-capture the twin pillars of efficiency and effectiveness through which digital transformation delivers measurable performance gains. Nevertheless, despite its transformative potential, research on the implications of digital transformation remains scarce (Zhang et al., 2024)-a gap that is particularly pronounced in emerging economies such as Thailand, where limited digital literacy and dependence on imported Western technologies often postpone the realization of tangible business benefits.

At present, many firms engage in digital transformation initiatives, yet these projects often face significant challenges even after substantial investment (Guenzi & Habel, 2020). Consequently, investors view such initiatives as both opportunities and risks. When executed successfully, digital transformation can boost profitability, attract positive investor reactions, and raise firm value. However, it does not invariably deliver benefits (Wang & Xia, 2024), because such projects demand sizable capital outlays (Jardak & Hamad, 2022) and require extensive changes to business models, internal processes, and digital-skills proficiency (Clemente-Almendros et al., 2024). When firms cannot foresee concrete payoffs, adoption becomes increasingly complex (Lu & Xu, 2024). Moreover, poor system integration, inability to adapt to evolving market conditions and customer needs, and rising maintenance and technical-support costs can reduce financial performance and lead to decreases in firm valuation, underscoring that valuations depend on observable financial outcomes. Therefore, this study posits that digital transformation influences firm value indirectly-first by enhancing financial efficiency, measured by return on assets and return on equity, and financial effectiveness, reflected in revenue growth and net profit margin, and later by shaping investor perceptions, ultimately leading to higher firm valuation. Despite the importance of this issue, few studies have investigated how digital transformation affects firm value (Jardak & Hamad, 2022), especially through mediation mechanisms. This study therefore models four financial metrics as mediators to clarify how digital investments translate into measurable gains in firm valuation, thus addressing a critical gap in both academic research and managerial practice.

Purpose

To examine the impact of digital transformation on firm values through financial efficiency and financial effectiveness among companies listed on the Stock Exchange of Thailand (SET100 index).

Literature Review

Financial efficiency, defined as the effective utilization of resources to achieve organizational objectives (Omondi-Ochieng, 2019), is commonly associated with profitability metrics such as return on assets and return on equity. During the COVID-19 pandemic, digital transformation enhanced both financial and non-financial performance, particularly by improving risk diversification, thereby increasing business resilience and adaptability to uncertainties (Liu et al., 2024). While digital transformation has a generally positive impact on financial performance, its benefits are more pronounced among firms that are already financially successful (Vu et al., 2024). In the banking sector, the adoption of digital technologies enhances the profitability of commercial banks—especially those with large asset bases and low capital ratios—by improving asset quality, operational efficiency, and risk management (Chao et al., 2024). Advanced technologies such as artificial intelligence, blockchain, and big data play a critical role, with blockchain investment showing a significantly positive effect on return on equity, more so than on market value (Sun & Jiao, 2024). Similarly, the adoption of emerging technologies in banking improves financial efficiency, as measured by return on assets and return on equity, by promoting more effective asset utilization and increasing shareholder wealth (Theiri & Hadoussa, 2024). Furthermore, digital transformation contributes to higher return on equity by reducing external transaction costs and enhancing internal control efficiency. Notably, state-owned enterprises appear to benefit more from digital transformation than private firms (Gao et al., 2023). Based on these considerations, this study hypothesizes the following:

H1. Digital transformation has a positive effect on financial efficiency.

Financial effectiveness, in contrast, reflects an organization's ability to achieve its financial objectives and is commonly measured by revenue growth and net profit margin. Recent studies have highlighted the role of digital transformation in enhancing financial effectiveness; however, some digital activities have been found to have an insignificant effect (Q.-R. Liu et al., 2023). The adoption of generative AI in SMEs with strong technological infrastructure significantly enhances revenue growth, as a well-developed infrastructure facilitates effective AI utilization, reduces operational time, and improves responsiveness to market demands (Soni, 2023). Furthermore, intelligent data utilization, smart risk management, and AI-driven workforce management positively influence revenue growth by mitigating human resource risks, optimizing marketing strategies, and enhancing organizational competitiveness (Kumar et al., 2024). While the presence of digital experts or the adoption of digital technologies alone may not significantly improve net profit margins, the synergy between these factors enables firms to maximize the benefits of digital

transformation (Fabian et al., 2021). Moreover, substantial investments in digital technology by large corporations may initially have a negative impact on net profits, as the transformation process is either ongoing or newly implemented, delaying the realization of returns on investment (Melnikov & Kalabina, 2023). Nevertheless, digital transformation has been shown to enhance gross profit margin, operating profit margin, and net profit margin by reducing financial, selling, and administrative costs. The financial impact of digital transformation varies by stage; initial investments in software, hardware, and workforce development may temporarily weaken performance, but as the transformation progresses, its positive effects gradually become evident in financial indicators (H. Liu et al., 2023). Additionally, digital transformation contributes to increases in earnings per share, return on equity, return on assets, total assets, fixed assets, intangible assets, and net profit margin, while having a significantly negative effect on the cost-to-income ratio and the equity multiplier (Chen & Zhang, 2024). Based on these considerations, this study hypothesizes the following:

H2. Digital transformation has a positive effect on financial effectiveness.

Firm value—a critical gauge of corporate success—captures a company's market valuation and is commonly proxied by Tobin's Q. Prior research indicates that adopting digital technologies significantly boosts firm value as measured by Tobin's Q (Wei & Li, 2024). Moreover, disclosing digital-transformation initiatives signals stronger future cash flows to investors and helps lower the cost of capital (Salvi et al., 2021). Although digital transformation can temporarily depress return on assets and return on equity because of substantial upfront investments, it ultimately exerts a positive long-term influence on Tobin's Q (Jardak & Hamad, 2022). On this basis, this study proposes the following hypothesis:

H3. Digital transformation has a positive effect on firm values.

Financial efficiency is a crucial determinant of firm value, as it reflects a company's ability to utilize financial resources effectively. It is also a key consideration for investors, particularly in firms with high returns on assets, as it signals efficient asset utilization and strong financial performance (Marsha & Murtaqi, 2017; Markonah et al., 2020; Isaac & Setiawan, 2022). Several studies have identified a significant positive correlation between return on assets and firm value, as measured by Tobin's Q, suggesting that investors tend to favor highly profitable companies. However, return on equity has, in some cases, shown an insignificant or even negative impact on firm value (Jonnus & Marsudi, 2021). Conversely, other research has reported that return on equity positively influences firm value, while return on assets demonstrates an insignificant negative effect (Listiadi, 2023). Further studies confirm a significant positive relationship between return on equity and firm value, indicating that effective cost and asset management can contribute to higher shareholder returns (Sutomo & Budiharjo, 2019; Yustrianthe & Mahmudah, 2021; Derestiyani & Suseyto, 2023). Based on these considerations, this study hypothesizes the following:

H4. Financial efficiency has a positive effect on firm values.

Financial effectiveness is a crucial factor that directly influences firm value, as it reflects a company's ability to generate revenue and manage costs, key elements that investors consider when assessing an organization's potential. Several studies have found that sales growth significantly enhances firm value, indicating that strong revenue performance sends a positive signal to investors regarding a company's financial health, thereby leading to increased stock prices and market valuation (Sulastri et al., 2023; Liviani & Rachman, 2021; Okerekeoti, 2021). Additional research further confirms that revenue growth positively affects firm value (Dewanthi & Purwatiningsih, 2024; Azaroh & Majidi, 2024). However, findings regarding net profit margin remain inconsistent. Some studies have reported an insignificant negative effect of net profit margin on firm value (Janice & Toni, 2020), while others indicate a positive but statistically insignificant relationship (Wahid, 2022; Suraya & Gantino, 2022; Anisa, 2023). Based on these considerations, this study hypothesizes the following:

H5. Financial effectiveness has a positive effect on firm values.

Digital transformation not only improves organizational productivity, reduces operational costs, and enhances innovation efficiency—thereby increasing economic value and positively affecting Tobin's Q (Wang & Xia, 2024)—but also raises firm value by optimizing operational processes, strengthening organizational culture, and improving resource efficiency, all of which collectively lower costs and boost adaptability to market fluctuations (Zareie et al., 2024). Nevertheless, these benefits can take several years to materialize and be fully reflected in traditional financial performance indicators (Jardak & Hamad, 2022). Based on these considerations, this study proposes the following hypothesis.

H6. Digital transformation has a positive effect on firm values through financial efficiency.

H7. Digital transformation has a positive effect on firm values through financial effectiveness.

Methodology

Sample Selection and Data Analysis

The research sample comprises companies listed on the SET100 index of the Stock Exchange of Thailand from 2019 to 2023. We employed Structural Equation Modeling (SEM) using SPSS Amos 24 to test our hypotheses and examine both the direct and indirect effects of digital transformation on firm value via financial efficiency and financial effectiveness. Path analysis within SEM estimates the measurement model, which links observed indicators to their latent constructs, and the structural model, which tests the hypothesized causal paths among latent variables, within a single framework. By explicitly modelling measurement error, SEM improves the reliability of parameter estimates and accommodates complex relationships—such as mediation and multiple interrelated dependent paths—that traditional regression methods cannot analyze simultaneously.

Measurements of Variables

1. Digital Transformation

Text analysis has become an essential tool for examining unstructured data, providing valuable insights into firms' digital transformation initiatives (Zou et al., 2024). Increasingly, researchers are leveraging annual reports—comprehensive documents detailing financial and operational performance—to assess companies' digital transformation efforts. This report, which formally discloses a company's financial statement and operational activities for a given fiscal year, encompasses not only financial metrics but also strategic decisions (Osborne et al., 2001). Significant strategic changes, such as digital transformation—an essential and inevitable step in the digital economy—are expected to be reflected in this document. Consequently, extracting information related to digital transformation from annual reports is both logical and feasible (Guo & Xu, 2021). In line with this approach, this study employs text analysis to construct a digital transformation disclosure index by quantifying the frequency of keywords associated with digital technologies and their applications, thereby indicating the level of digital transformation within an organization. The calculation of keyword frequencies will proceed as follows:

$$\text{Digital transformation (DT)} = \ln (1 + \text{the frequency of keywords associated with digital technologies and their applications})$$

As Narattaruksa (2001) observed, the majority of technology, knowledge, and information related to computing received by Thailand from the West is primarily in English. Although the Royal Society of Thailand has attempted to create new terms by combining existing Thai words to convey new meanings, these efforts have met with varying degrees of acceptance. This is particularly evident in the case of foreign terminology associated with emerging technologies, which often develop at a faster pace than the Institute can formulate equivalent Thai terms. Even when the most appropriate new terms are coined, they frequently struggle to gain traction against prevailing user preferences (Kanchanawan, 1992). To address this, the study exclusively utilizes English-language keywords extracted from the English version of annual reports, identifying and categorizing 79 keywords into five categories, as detailed in Table 1.

2. Financial Efficiency

Financial efficiency is defined by return on assets and return on equity. Return on assets (FNE1), which compares net income to total assets, is widely used to evaluate how efficiently a company transforms its asset base into profits, reflecting the effectiveness of capital utilization (Choiriyah et al., 2021). Similarly, return on equity (FNE2) measures the profitability generated per unit of shareholder equity, providing insights into a firm's efficiency in delivering returns to its shareholders (Novia & Srihadi, 2020).

3. Financial Effectiveness

The study employs revenue growth and net profit margin as measures of financial effectiveness, which is defined as a firm's capacity to generate revenue and profit. Revenue growth (FNT1) serves as a key indicator of market expansion and is a fundamental metric for assessing corporate growth (Okerekeoti, 2021). Similarly, net profit margin (FNT2) evaluates the extent to

which revenue is converted into profit after accounting for expenses and taxes, and it is considered one of the most critical indicators of financial effectiveness (Slawomir et al., 2018).

Table 1 Digital transformation keywords.

Category	Keywords
Artificial Intelligence Technology	Artificial Intelligence, Authentication, Autonomous Driving, Biometrics, Business Intelligence, ChatGPT, Deep Learning, Face Recognition, Gemini, Image Understanding, Intelligent Data Analysis, Intelligent Robotics, Investment Decision Aid Systems, Machine Learning, Natural Language Processing, Semantic Search, Speech Recognition
Big Data Technology	Augmented Reality, Big Data, Credit Information, Data Mining, Data Visualization, Heterogeneous Data, Mixed Reality, Text Mining, Virtual Reality
Block Chain Technology	Blockchain, Differential Privacy Techniques, Digital Currencies, Distributed Computing, Smart Financial Contracts
Cloud Computing Technology	Billion Level Concurrency, Brain-Like Computing, Cloud Computing, Cognitive Computing, EB Level Storage, Fusion Architecture, Graph Computing, Green Computing, In-Memory Computing, Information Physics Systems, Multi-Party Secure Computing, Streaming Computing
Digital Technology Applications	B2B, B2C, C2B, C2C, Cybersecurity, Digital Finance, Digital Marketing, E-Commerce, Financial Technology, Intelligent Culture And Tourism, Intelligent Customer Service, Intelligent Energy, Intelligent Financial Contracts, Intelligent Healthcare, Intelligent Investment Advisory, Intelligent Marketing, Intelligent Transportation, Internet Connection, Internet Finance, Internet Health, Internet of Things, Industrial Internet, Mobile Internet, Mobile Payment, NFC Payment, O2O, Open Banking, Quantitative Finance, Smart Agriculture, Smart Environmental Protection, Smart Grid, Smart Home, Smart Robots, Smart Wear, Third-Party Payment, Unmanned Retail

4. Firm Value

Firm value (FV) was assessed using Tobin's Q, a widely recognized market-based performance indicator. Tobin's Q, defined as the ratio of a firm's market value to the book value of its assets (Hejazi et al., 2016), provides a comprehensive measure of a firm's economic efficiency and the extent to which its market valuation reflects its underlying asset base. Tobin's Q has been extensively employed in empirical research (Wei & Li, 2024; Zareie et al., 2024).

Results

1. Descriptive Statistics

Table 2 Descriptive statistics.

Variables	Minimum	Maximum	Mean	S.D.
FV	0.126	8.047	1.354	1.429
DT	0.000	4.234	1.834	1.117
FNE1	-12.902	40.449	5.635	5.898
FNE2	-29.746	54.423	11.970	11.830
FNT1	-54.521	171.223	10.883	30.969
FNT2	-38.680	52.246	12.251	12.283

The descriptive statistics presented in Table 2 highlight the average values of the key variables in this study. Firm value has a mean of 1.354, while digital transformation exhibits an average level of 1.834, indicating relatively consistent adoption across firms. Financial efficiency, measured by return on assets and return on equity, shows mean values of 5.635 and 11.970, respectively. For financial effectiveness, revenue growth has a mean of 10.883, and net profit margin averages 12.251. These average values provide a general overview of the financial performance and digital transformation levels among the firms included in the sample.

2. Multicollinearity Testing

Table 3 Multicollinearity testing.

Variables	FV	DT	FNE1	FNE2	FNT1	FNT2	Tolerance	VIF
FV	1							
DT	0.764**	1					0.815	1.227
FNE1	0.560**	0.350**	1				0.421	2.373
FNE2	0.566**	0.343**	0.677**	1			0.502	1.993
FNT1	0.463**	0.344**	0.416**	0.449**	1		0.716	1.397
FNT2	0.350**	0.225**	0.530**	0.362**	0.089	1	0.690	1.448

**. Correlation is significant at the 0.01 level (2-tailed).

Multicollinearity testing, as presented in Table 3, was conducted to assess the interdependence among the predictor variables and to ensure the validity of the structural equation model, following the criteria outlined in the study by Senaviratna and Cooray (2019). Pearson correlation coefficients between variables are all below 0.80. Additionally, the tolerance values exceed 0.1, and the variance inflation factor (VIF) values are below 10 for all variables. These findings indicate that the relationships among the variables are within acceptable limits, suggesting that the variables used in this study are deemed appropriate for statistical analysis,

and they can be reliably employed in hypothesis testing without compromising the accuracy of the model.

3. Hypothesis Testing

Table 4 Assessment of model fit.

Fit indices	Cut-off criterion	Results	Description
χ^2	p-value > 0.05	0.835	Model fits well
χ^2/df	< 3.00	0.043	Model fits well
CFI	> 0.95	1.000	Model fits well
GFI	> 0.95	1.000	Model fits well
AGFI	> 0.90	0.999	Model fits well
RMSEA	< 0.08	0.000	Model fits well

The structural equation model demonstrates a good fit, as evidenced by its adherence to the established model fit criteria recommended by Dash and Paul (2021), as shown in Table 4. This indicates that the model does not exhibit any significant structural misspecification. These results support the appropriateness of the developed model and suggest that it can be reliably used to analyze the impact of digital transformation on firm value through financial efficiency and financial effectiveness.

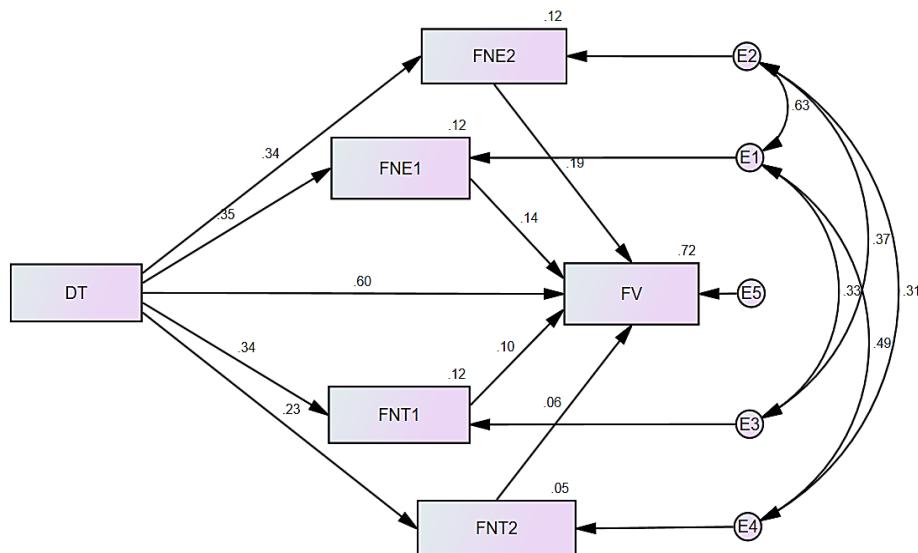


Figure 2 Path Diagram

Table 5 Direct effect results.

Direct effect	Hypothesis	Estimate	P-value	Description
DT → FNE1	H1a	0.350	***	Significant
DT → FNE2	H1b	0.344	***	Significant
DT → FNT1	H2a	0.344	***	Significant
DT → FNT2	H2b	0.225	***	Significant
DT → FV	H3	0.598	***	Significant
FNE1 → FV	H4a	0.145	0.005**	Significant
FNE2 → FV	H4b	0.194	***	Significant
FNT1 → FV	H5a	0.105	0.008**	Significant
FNT2 → FV	H5b	0.059	0.145	Insignificant

*** p < 0.001, and ** p < 0.01, respectively.

Figure 2 and Table 5 show that digital transformation significantly improves financial efficiency, financial effectiveness, and firm value. It raises return on assets and return on equity (p < 0.001), indicating greater asset and equity productivity. Digital transformation also enhances financial effectiveness by increasing revenue growth and net profit margin (p < 0.001). Consequently, it exerts a strong direct positive effect on firm value (p < 0.001). Financial efficiency further boosts firm value, as both ROA and ROE display positive, significant coefficients (p < 0.01 and p < 0.001, respectively). Among the effectiveness indicators, revenue growth positively influences firm value (p < 0.01), whereas net profit margin does not reach statistical significance (p > 0.05). The muted impact of net profit margin likely reflects industry differences in cost structures, pricing strategies, and discretionary accounting or tax items, which dilute its link to underlying operating performance and, in turn, to valuation.

Table 6 Indirect effect results.

Indirect effect	Hypothesis	Description
DT → FNE1 → FV	H6a	Mediate
DT → FNE2 → FV	H6b	Mediate
DT → FNT1 → FV	H7a	Mediate
DT → FNT2 → FV	H7b	Not mediate
Standardized indirect effects		0.167
Bias-corrected percentile method		0.002
Percentile method		0.000

Table 6 shows that both financial efficiency and financial effectiveness play pivotal mediating roles between digital transformation and firm value. Financial efficiency—captured by return on assets and return on equity—transmits the benefits of digital initiatives to higher firm

value. Financial effectiveness, proxied by revenue growth, also mediates this link. In contrast, net profit margin is not a significant mediator: although digital transformation directly increases firm value, its influence on net profit appears to need an adjustment period for technological learning and strategic adoption, resulting in muted valuation effects.

Discussion

Digital transformation has a significant positive impact on financial efficiency, particularly as measured by return on assets, underscoring its crucial role in enhancing corporate financial performance. Advanced digital tools, such as big data analytics, enterprise resource planning systems, and digital supply chain platforms, facilitate process improvements, enhance resource utilization efficiency, and contribute to increased returns on assets. These findings align with studies by Vu et al. (2024), Chao et al. (2024), and Liu et al. (2024). Furthermore, digital transformation significantly improves financial efficiency, as measured by return on equity, demonstrating that the integration of digital technologies, such as big data analytics, business process automation, and cost management platforms, enables firms to reduce unnecessary expenditures, improve strategic planning accuracy, and optimize operational efficiency. This, in turn, leads to increased profitability and higher returns for shareholders, consistent with the findings of Gao et al. (2023), Theiri and Hadoussa (2024), and Sun and Jiao (2024), which highlight the significant positive impact of digital adoption.

Digital transformation has a significant positive impact on financial effectiveness, particularly as measured by revenue growth. The use of digital platforms and online marketing tools enables companies to respond more swiftly to consumer demands, resulting in increased sales and sustained revenue growth. Firms that utilize advanced data analytics can accurately identify market trends and consumer behavior, facilitating the development of products and services tailored to customer needs. Additionally, digital technologies accelerate product development cycles, enabling faster market entry and driving revenue expansion. These findings align with the studies of Q.-R. Liu et al. (2023), Soni (2023), and Kumar et al. (2024). Moreover, digital transformation significantly enhances financial effectiveness, as measured by net profit margin. By leveraging advanced data analytics, firms are able to forecast costs and implement strategic planning with greater precision. The integration of automation further reduces labor costs and improves operational efficiency, leading to higher net profit margins. These results are consistent with the studies of Fabian et al. (2021), Melnikov and Kalabina (2023), and H. Liu et al. (2023), which confirm the significant positive impact of digital transformation on net profit margin.

Digital transformation has a significant positive direct effect on firm value by enabling companies to gain strategic advantages and strengthen investor confidence through improved resource management, risk mitigation, and adaptability to market changes. These findings are consistent with those of Wei and Li (2024), Wang and Xia (2024), and Zareie et al. (2024), who

highlight that digital transformation enhances firm value by fostering transparency and improving investor perceptions of corporate reliability.

Financial efficiency, measured by return on assets and return on equity, has a significant positive impact on firm value. Firms that maximize asset utilization through a high return on assets demonstrate strong profitability and effective resource management, which enhance investor confidence and contribute to higher market valuation (Marsha & Murtaqi, 2017; Jonnius & Marsudi, 2021). Similarly, a high return on equity reflects a firm's ability to generate substantial returns for shareholders, thereby attracting investor interest and enhancing firm value through financial stability and capital efficiency (Janice & Toni, 2020; Yustrianthe & Mahmudah, 2021; Derestiyani & Suseyto, 2023).

Financial effectiveness, measured by revenue growth and net profit margin, influences firm value in different ways. Revenue growth has a significant positive impact on firm value, as it reflects a company's ability to innovate, expand its market reach, and maintain customer satisfaction—key drivers of long-term competitiveness and value creation (Liviani & Rachman, 2021; Okerekeoti, 2021; Dewantri & Purwatiningsih, 2024). In contrast, net profit margin has a positive but statistically insignificant effect on firm value (Wahid, 2022; Suraya & Gantino, 2022; Anisa, 2023). Although it reflects cost control and operational efficiency, investors may place greater emphasis on other financial indicators when evaluating firm value.

Digital transformation has a significant positive impact on firm value through financial efficiency, particularly as measured by return on assets and return on equity. The integration of digital technologies enhances asset management, reduces operational costs, and improves business agility, leading to increased return on assets and, ultimately, higher firm value (Vu et al., 2024; Chao et al., 2024; Jonnius & Marsudi, 2021). Similarly, digital transformation improves return on equity by streamlining operations and optimizing the allocation of financial resources, which in turn contributes to greater shareholder returns and enhanced firm value (Sun & Jiao, 2024; Theiri & Hadoussa, 2024). A higher return on equity signals strong growth potential and sustainable profitability, attracting investor interest and driving firm value (Sutomo & Budiharjo, 2019; Listiadi, 2023).

Digital transformation also positively impacts firm value through financial effectiveness, particularly via revenue growth, by enabling firms to expand operations, optimize distribution channels, and enhance customer experience, thereby increasing competitiveness and sales (Q.-R. Liu et al., 2023; Soni, 2023). Higher revenue growth contributes to stronger investor perceptions of future earnings potential, which in turn elevates market valuation, consistent with the findings of Sulastri et al. (2023) and Azaroh and Majidi (2024). However, while digital transformation also improves financial effectiveness through enhanced net profit margins, this effect on firm value is statistically insignificant. Although digital tools reduce costs and improve profitability (H. Liu et al., 2023; Chen & Zhang, 2024), net profit margin may carry less weight in investment decisions (Suraya & Gantino, 2022; Anisa, 2023), as it is more susceptible to external influences such as taxes, raw

material costs, and financial expenses than to the benefits of digital transformation alone. This may explain the weaker indirect effect of net profit margin on firm values.

Conclusion

This study shows that digital transformation has a strong, positive influence on firm value, both directly and indirectly. It significantly improves financial efficiency—reflected in higher returns on assets and returns on equity—and financial effectiveness, reflected in faster revenue growth; these gains, in turn, raise market value. Although digital initiatives also increase net profit margin, this metric does not meaningfully mediate the link to firm value because it is more vulnerable to external influences than to benefits derived from digital transformation. Overall, the findings confirm that digital transformation drives sustainable value creation by enhancing asset utilization, equity returns, and revenue growth, even while the mediating effect of net profit margin remains muted.

Research Implications

This study makes a dual contribution to scholarship and practice by clarifying how digital transformation enhances firm performance. Theoretically, it demonstrates that AI-driven analytics and integrated e-commerce platforms constitute strategic resources under the Resource-Based View (Barney, 1991); that these technologies foster organizational agility and continuous innovation in line with Dynamic Capability Theory (Teece et al., 1997); that their effectiveness depends on alignment among technological, organizational, and environmental dimensions as prescribed by the Technology–Organization–Environment framework (Tornatzky & Fleischner, 1990); and that transparent disclosure of digital initiatives operates as a credible signal of strategic intent to investors, consistent with Signaling Theory (Spence, 1973). Practically, our findings imply that managers should direct investment toward digital infrastructure and workforce digital competencies; that investors should emphasize return on assets, return on equity, and revenue growth rather than net profit margin when assessing digitally transformed firms; that researchers should investigate the moderating roles of policy regimes and industry structure; and that policymakers should mandate standardized reporting of digital investments and incentivize digital infrastructure development to support inclusive, sustainable growth.

Research Limitations and Recommendations for Future Research

The study's limitations fall into three areas. First, using the frequency of digital-technology keywords in annual reports as a proxy may not capture actual investment levels or the depth of technology adoption—mentions alone do not guarantee implementation, potentially biasing measurement. Second, because the sample is drawn exclusively from the SET100 Index—consisting of large, highly liquid firms—the results may not generalize to smaller or less liquid companies elsewhere in the Thai stock market. Third, omitting firm-specific characteristics (e.g.,

size, age, capital structure) overlooks important sources of heterogeneity that could influence both the pace and scope of digital transformation.

To reduce these limitations, future research should employ more direct measures of digital transformation, such as technology expenditures, project budgets, or the ratio of technology spending to revenues, to enhance measurement accuracy. Qualitative methods (e.g., executive interviews) could provide richer insights into strategic motivations, challenges, and barriers to adoption. Broadening the sample to include all listed firms from the SET index and MAI index would facilitate cross-industry comparisons, yielding more robust policy implications. Finally, incorporating firm attributes, such as size, age, and capital structure, as control variables or, when appropriate, moderators would allow researchers to test how heterogeneity across firms amplifies or attenuates the relationships under study, thereby deepening our understanding of digital transformation's varied impacts.

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